

**HETEROGENEOUS BANDGAP STRUCTURES FOR SEMICONDUCTOR
DEVICES AND MANUFACTURING METHODS THEREFOR**

Abstract

Semiconductor devices include a wide bandgap semiconductor layer having an array of discontinuous wide bandgap semiconductor regions therein that contribute to a reduction in ionization energies of dopants in the wide bandgap semiconductor layer relative to an otherwise equivalent wide bandgap semiconductor layer that is devoid
5 of the array of discontinuous wide bandgap semiconductor regions. The discontinuous wide bandgap semiconductor regions and the wide bandgap semiconductor layer have the same net conductivity type, but the discontinuous wide bandgap semiconductor regions are typically more highly doped to thereby provide excess charge carriers to the wide bandgap semiconductor layer.